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Identification of Critical Success Factor during ERP implementation

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Abstract: Over the last two decades the ERPs have become significant for all types of organizations. In the corporate world, the organizations need to manage the resources and finances effectively to be competitive in the market. Therefore, it is really important to have a tool that can not only integrate but can also provide the effective/real time information and ERP is the best solution for this purpose.
However, there are high chances of failure in the ERP implementations because of many reasons, and the benefits associated with ERPs can only be achieved through successful implementations. Therefore, the identification of critical success factors (CSF) in the early stages of the implementation is critical and helps the project team to improve the chances of success.
In this paper, we have highlighted the CSFs for successful ERP implementation by presenting the experience of three ERP implementations. The CSFs identified in this paper have been presented in such a generalized manner that they can be used for the successful ERP implementation in any industry.

Key words: BP (Business Process),CSF (Critical success factors) , ERP (Enterprise resource planning), RFP (Request for proposal).

INTRODUCTION

Currently, we are living in the Information Era and all organizations of any significance need to adopt an automated and integrated computerized system to have access to real time and effective information so as to be competitive in the market. Since the last two decades, industries have faced complex challenges to achieve increase in the profitability, abide by the guidelines of the regulators and avoid the risks so inherent in the business and at the same time improve the customer services. To equip themselves to deal adequately with the above challenges, almost all companies have either implemented or are actively looking for implementing ERP applications in the organization.
ERP business is one of the largest businesses in the software industry. According to Gartner, Inc "Worldwide enterprise software revenue is estimated to be over $267 billion in 2011, 9.5 percent increase from 2010 revenue of $244 billion. The enterprise software market is projected for continued growth in 2012, with revenue forecast to reach $288 billion". SAP, ORACLE & Microsoft ERP vendors are well-known and worldwide accepted. All of them have significant advantages and it helps the organizations to reduce the operating cost, improve customer services, achieve good inventory management, etc.
Implementing ERP is not an easy task it requires a lot of human effort and huge capital. Once a company decides to implement the ERP, it is difficult to go back to the old system because it is expensive as well as changes the mind set of human resources. There are a number of examples available in the world where ERP implementation attempt has failed miserably and the company has lost not only the money that they had invested in the ERP but the business has been hurt as well.
Broadly, Critical success factor are the few areas that help the organization to track the ERP implementation and ensure that it is progressing in the right direction. Critical Success factor is an important element in ERP implementation because it provides the guidance to the team for ensuring smooth implementation. In almost all ERP researches, it is highlighted that the rate of failure of ERP is high and CSF is the key to avoid failure.

LITERATURE REVIEW

Based on different researchers work in the field of ERP implementations, Nattawee & Siriluck [1] the researcher interviewed 10 Thai SME companies with medium sized ERP package. The writer highlighted the success factors of ERP implementation and the top one on the list is the Executive management support. The involvement of the top management is to create the adaptation impression in the organization, create awareness, and help out in refining the process and the change management. The other area is the user involvement which creates the positive attitude in others for accepting the ERP implementation. Another area is the vendor support and competence which is important because the users always believe in "what they have seen", if the user feels that the vendor is not competent than it would create problem in the implementation. One another important area is the quality of ERP application that includes the user friendliness of the application, ease of implementation in the respective area, etc. Finally, the most important area is the transfer of knowledge, related to the ERP application, to the organization employees and/or internal ERP implementation team.
Robert & Leslie [2] highlighted two case studies. In the first company, both writers highlighted that the success factors which are critical when implementing ERP are the top management support & dedicated resources. Researcher highlighted that due to the top management support, almost all of the management issues are addressed properly and the organization and all other stake holders facilitate the ERP team in the implementation. The other area is the dedicated resources. According to the researchers, the internal team has better understanding of internal processes and behavior and moreover, the acceptability of internal resources is very high. In addition to this, the trust between the teams is a key; the selection of vendor is also a CSF as well as the vendor support because if the vendor placed their best resources then it would play a vital role in the successful implementation. In the other case study, the researcher highlights that the continuous presence of top management and vendor support

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is critical success factor of ERP implementation. Selection of ERP vendor and easy access to that vendor team during the implementation would lend to the major contribution toward the success.

Somers & Nelson [4] ERP implementation are high risk project it should need to manage properly. Companies need to understand the importance of CSF's prior to start the ERP project. Moreover companies need to monitor the ERP project and where required to get the help with CSF's for tracking the project. The researcher also highlighted the 22 CSF's in their work mention in table-1 with the mean worked by the author.

METHODOLOGY

The aim of this paper was to understand the CSF' s as it is an important part before starting any ERP implementation. To achieve this, they have reviewed extensive literature and finally chose to utilize Somers & Nelson [4] identified CSF for comparing with the cases studies. Table 1 shows Somers & Nelson [4] CSF's with result, the table is been order with the CSF's degree of importance.

Somers & Nelson [4] identified 22 CSF's in their paper; they admitted that there are number of paper available where some other researchers compare their case study work with their developed CSF. We are also trying to use the similar model and comparing three of our case studies CSF with Somers & Nelson [4] CSF's mention in table-1.

The data collection activity is based on author's personal experiences in the implementation, un-structured interviews, participative observation, receipt and review of documents relating to the ERP implementation progress and results, email updates, and survey instruments. The Interview questionnaire document is available in Appendix A (Appendix A Form is developed by the authors based on their own observations during the implementations and Somer & Nelson research paper [4]). This questionnaire was prepared well before the interviews, during which representative could elaborate on their scorings, and finally have an option to add other CSFs with reasons if anyone think it is necessary. First authors himself fill the form for all three implementations and then conducted interviews over the phone with the concern people in the all three organizations. The author sent the Form and case study (case study of each organization prepared by the author himself first because they have been involved in implementations) in advance three days emailed to all the concerns before starting the telephonic interview mention them specifically to review the case study and Form thoroughly in advance. During the telephonic interview the author discusses one by one all questions fill the form himself and it was loosely interview lasting between 20 and 35 minutes each. The people who interviewed are Senior people including CEO's, COO's, Business heads, project manager, vendors and the team involved in the ERP implementation.

Critical success factor	Mean
Top Management commitment	4.29
Project Team Competence	4.20
Interdepartmental Co-operation	4.19
Clear Goals and Objective	4.15
Project Management	4.13
Inter Department Communication	4.09
Management of Expectation	4.04
Project Champion	4.03
Vendor Support	4.03
Careful Package Selection	3.89
Data Analysis and Conversion	3.83
Dedicated Resources	3.81
Steering Committee	3.97
User Training	3.97
Education on New Business Process	3.76
BPR	3.68
Minimal Customization	3.68
Architecture Choices	3.44
Change Management	3.43
Vendor Participation	3.39
Vendor Tools	3.15
Use of Consultant	2.90

Table 1- The Mean Ranking if CSF's by degree of importance in ERP Implementation (Somers & Nelson[4])

CASE STUDIES

COMPANY A:

Company A is a leading public sector General Insurance company located in India having international divisions in South Asia specializes in General insurance. The main reasons to install the ERP were as follows:

Legacy system was not able to support the business requirement, standardized the business process all over the regions, customer service was not up to the mark, business decentralization, no business control, duplicate data entry, targeted reduction in the policy issuance time from 7 days to one day, etc.

Total ERP implementation took 7 + years. For selection of ERP, Company A reviewed five local solutions (Erasource Company, stowe Research Company, Customsoft, 360erp and 3i infotech). Company A used the RFP process to finalize the vendor and they had handed over this RFP to all the vendors. The RFP review committee consisted of 1 expert from the industry (consultant), the CEO, CIO, COO, CFO and 3 second layer IT people. They met themselves with all the vendors and finalized 3i infotech (PREMIA). The Company started the ERP project in January 2006. The management created a team to implement the ERP project under the CIO leadership. As the CIO did not have any IT or ERP background, the project started on the wrong foot. Vendor handed over the project starting documents and the ERP team filled all documents themselves without involving any business people. In addition, as the IT team took this project as a liability to the department, no serious efforts were made in this regard. The whole IT team's focus was to upgrade the infrastructure and multi million Rupees project was initiated which diverted the management's focus toward the infrastructure project. As the Company A was the public sector organization, the approval process took a lot of time. At the time of selection, the ERP data migration had not been considered and suddenly it propped up. Conflicts arose between Vendor and ERP team in this regard, whereupon, the management decided not to disturb the existing ERP implementation project and have a separate contract with the vendor for migration at additional cost. The original ERP implementation plan was two years but it is in 7th year of implementation. The Gap analysis activity has taken place

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three times. The project is over budget by 700% and it is still in progress, 95% project work has been completed by end of dec-2012 and they have planned to finish it by Jun-2013. We will now consider some of major CSF's highlighted by the company A team that take this project as successful ERP implementation are summarized:-

- Top Management commitment
- Dedicated Project Team & project Management
- Designing of Proper Data migration processes
- Preparing proper internal IT team
- Preparing internal QA teams for customizations:
- Hiring of trainers for ERP Training
- Steering Committee & Management Expectation
- Change management process in place
- Introducing centralized vendor support mechanism

SUMMARY COMPANY A

Throughout the project there was four factors were considered critically i.e top management support, proper dedicated team for ERP implementation, Steering committee & vendor support. Although the project been delayed significantly but due to high support of CEO the project been 95% completed. When the implementation began, the management get lot of resistance in the first phase they have tried to convince all of them and in parallel, they reshuffled number of employees who create problems during the project.

Dedicated ERP team is the second CSF in the initial stage the management wasn't convince to put dedicated team to the project but as project go on they have realized that without dedicated team this cannot go on. Vendor (PREMIA) consultant's intensive involvement is the third CSF. The Data migration is the fourth CSF for this project. Centralized issue management system is the fifth CSF of the project. Project Management is the sixth CSF of this stage and due to the involvement of steering committee, the ERP team needed to carry out each and every activity in the project plan. In the end the author compare their work with Somers & Nelson [4] CSF in the Table-2 with three areas (Pre-implementation, During Implementation and Post Implementation). The table-2 will brief that how this project executed and the identification of CSF in each area.

Critical Success Factors	Pre-Implementation	During-Implementation	Post-Implementation
Top Management commitment	High	High	High
Project Team Competence	Low	High	High
Interdepartmental Co-operation	Low	High	Medium
Clear Goals and Objective	High	Medium	Medium
Project Management	Low	High	Medium
Inter Department Communication	Medium	High	Medium
Management of Expectation	High	High	High
Project Champion	Low	High	Medium
Vendor Support	Medium	High	High
Careful Package Selection	High	**Low**	**Low**
Data Analysis and Conversion	Medium	High	Medium
Dedicated Resources	Medium	High	High
Steering Committee	High	Medium	Medium
User Training	Medium	High	High
Education on New BP	Medium	High	High
BPR	High	High	Medium
Minimal Customization	High	High	High
Architecture Choices	Medium	High	Medium
Change Management	High	High	Medium
Vendor Participation	High	High	High
Vendor Tools	High	High	High
Use of Consultant	High	High	High

Table- 2: Critical Success Factor list is taken from Somers & Nelson[4]

COMPANY B :

Company B is a privately owned Leading General Insurance company in Pakistan, specializes in General insurance. There are 2500+ employees with more than 60+ local & international branches. The main reasons to install the ERP system were: Legacy systems were not providing the correct and real time information, distributed environment needed to be centralized; there was repetition of work within the company in different departments, customer services were not up to the mark, existing systems did not come up the rapid growth of the industry and the Software technology was outdated, etc.

In view of the above problems, the management suffered a lot and they decided to implement the ERP in the organization. For selection of ERP, Company B reviewed the five best insurance ERP's (SHMA solution, PREMIA, SDT South Africa, Lawson insurance solution & mindware insurance solution). Company B used proper RFP process and they invited all the above vendors to provide proper point wise response to the RFP. On the basis of the responses received, they selected the 3i infotech product PREMIA. Company B is approx. 50 years old and legacy system has been used in the company since 10 years. All the employees were very comfortable with the legacy system. In March 2007, company B decided to implement the ERP in the company. The management nominated the IT Head as the Head of the project. He started the project on the wrong foot and asked the IT department to start gap analysis. IT application Head started giving the requirements to the vendor team and formal gap analysis started without any proper plan. Initially, the vendor and IT management verbally decided to complete this gap analysis activity in three months' time. The vendor team completed the high level study and prepared the documents in three months time. The document was reviewed by the CIO of the company B and he realized the information given to vendor was not complete. He then asked for formal meeting and engaged some business people. When the vendor prepared document was shared with the business people, they highlighted a lot of issues, whereupon, the CIO decided to get the gap analysis redone by involving the business people. The vendor started the gap analysis again with new the team and they prepared the FSD (Functional specification documents). The Team took 9 months to complete the gap analysis and the CIO himself gave the sign off and the whole exercise of redoing the gap analysis took 12 months. Vendor started customization and they took 7 months to complete this activity. The implementation was started after one and half year of initiation the project. As Author mentioned earlier, the organization had decentralization environment and Company B management decided to implement the ERP in the largest and complex division (9 branches under one division). The Division Head was never involved in the implementation prior to starting

the implementation, but due to the management decision, he was ready to implement the system in his division first. He created a team in the division and allocated the team to ERP team. Then both teams started the implementation and the teams realized that the products of first division were not mapped to the ERP. The ERP team, including vendor team, prepared list of issues and shared it with the management of company B. Management reviewed these issues and realized that the gap analysis was not done correctly. Management constituted a committee to identify the issues and provide the report in one month's time. After one month, the management had before it the completed report with the committee findings. On the basis of the findings, the management disbanded the existing ERP team and formed another team with business people, under the CIO, to carry out the gap analysis again. New team consisted of 25 people and they started working again with the vendor and they took another month to complete the gap analysis again and submitted the ACD to the management. The Management decided to book a hotel conference room for one week and invited all the three top layers to review the requirements and after a week's time they jointly gave the sign off to the vendor. The Vendor reviewed the requirements and gave the timelines of 8 months to complete the customization. After 8 months, the application was again handed over to the company B ERP team and they started the implementation. At this time, ERP team selected the small division to implement the ERP. During the implementation, existing management resigned and the project again halted. The new management took over and started the implementation again, after a gap of three months with the new CIO. The new CIO took 4 months to review the gap analysis documents and resumed the project. The first thing the new CIO did was to get prepared a formal project plan and distributed it among all stakeholders. In addition, he created a formal team for each of the areas and started the activities. He implemented the ERP in 30 branches in four months' time and another 20 branches in 6 months' time. The Original plan was to implement the ERP in 1 year, but the project is in implemented in 5 years. The project was over budget by 75%. The management and the board were not happy with the progress of the project and the project is considered 98% completed.

We will now consider some of major CSF's highlighted by the company A team that take this project as successful ERP implementation are summarized:-

- Top Management commitment
- Change in IT team mid way during the project
- Project review meetings
- Involvement of Users
- Designing Proper Data migration processes
- Preparing internal QA teams for customizations
- Hiring trainers for ERP Training [Train the trainer concept]
- Introducing proper patch management mechanism
- Introducing centralized vendor support mechanism

SUMMARY COMPANY B:

Top management support is still a very important factor in the pre-implementation stage. There are number of employees in the company B who do not want to learn the new ERP system. They were used the OLD system and are not willing change anything. However, the management in the first stage tried to convince them and whosoever was not convinced was asked by the management to resign from the services. ERP team is the second CSF. On the initial stage Company B management did not allocate the good resources on the project. As a result, the project got delayed by approx 2 years. At this moment, they have allocated the right team and the implementation will be completed in June-2012.PREMIA consultant involvement is the third CSF of the project and they are putting their best on the project. Now 80% of the project has been completed and the remaining 20% have solid plans to be completed as per project timelines. The Data migration is the fourth CSF for this project. The data of 50 branches has been migrated and data migration of 10 branches is in process. Initially, the migration team had lot of issues; sometimes the master data was not completed, sometimes the branch claims were missing, the financial figures did not match the outstanding figure, etc. However, due to the commitment of the management and team now all these issues have been addressed and resolved. BPR is the fifth CSF of this project. Initially, the management focus was not on this task and they went live in the first branch without any preparation, which created lots of issues and there were many ifs and buts in the process. After the first implementation, the management decided to have the formal process change document and shared it with all branches prior to the start the implementation. In the end author compared their studies with Somers & Nelson [4] CSF's which is highlighted in the table-3.

Critical Success factors	Pre-Implementation	During-Implementation	Post-Implementation
Top Management commitment	High	High	High
Project Team Competence	Medium	High	Medium
Interdepartmental Co-operation	High	High	Medium
Clear Goals and Objective	High	High	Medium
Project Management	High	Medium	Medium
Inter Department Communication	High	High	Medium
Management of Expectation	High	High	High
Project Champion	Medium	High	Low
Vendor Support	Medium	High	Medium
Careful Package Selection	High	Medium	Low
Data Analysis and Conversion	High	High	Low
Dedicated Resources	Medium	High	Low
Steering Committee	Medium	High	Low
User Training	Medium	High	High
Education on new BP	High	High	High
BPR	High	Medium	Medium
Minimal Customization	High	High	High
Architecture Choices	High	Medium	Low
Change Management	High	High	High
Vendor Participation	Medium	High	High
Vendor Tools	Medium	High	High
Use of Consultant	High	Medium	Low

Table- 3: Critical Success Factor list is taken from Somers & Nelson[4]

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COMPANY C :

Company C is a privately owned Life Insurance company, which specializes in Life Assurance. There are 70+ employees with more than 5 different channels. Company C installed a local solution name SHMA (Sidat Hyder Morshed Associates) for their ERP systems. The objective of implementation was to integrate the different departments, provide real time information to the stakeholders; enable company C to integrate the ERP application with any third party tool without requiring of a lot of development, build in local insurance practices and web enablement. For selection of ERP, Company C reviewed 4 systems (PREMIA-3i by infotech, SHMA insurance solution, SDT South African insurance solution and SAP insurance standard). Company C provided the RFP to all vendors and asked them to submit detailed response. Upon the evaluation of the responses received from them, the company C selected SHMA. The biggest advantage with SHMA was the local presence and some implementation case studies, locally. In January 2009, the company started implementation with Group insurance module. As I mentioned earlier, company C was then a new company and therefore it was relatively easier for the vendor to implement the ERP processes in the company. Vendor provided the processes and the management reviewed it and whatever process suited the organization they got it implemented. Overall, the implementation was very smooth except for some issues in the financial module. In addition, there were a couple of modules in the ERP which were not implemented in any organization e.g Re-insurance and automated receipt mechanism. However, in the end complete modules were implemented in smooth fashion. As the Head of ERP did have a number of insurance implementations to his credit, the conflicts between the vendor and ERP team were managed easily. The Original implementation plan was of 2 years and it was completed before 2 years. The project was within budget. The management was very happy with the project and its overall success.

We will now consider some of major CSF's highlighted by the company A team that take this project as successful ERP implementation are summarized:-

- Top management commitment
- IT enability (ERP) is a must in any new initiative
- User training and education
- Balance investment in hardware & infrastructure
- Selection of Local ERP
- Strong communication between departments
- Local team formation for addressing the ERP QA issues
- Project Management review committee
- Change management process in place

SUMMARY COMPANY C:

The top management is still the first CSF because in the new company nobody knew what needed to be done and how the processes would be formed. Therefore, the management played key role here and they guided all departments about what was required. Entire management, including CEO of the company was on the floor throughout the project. The senior management was ready to spend anything to complete that project. There were a number of occasions when conflicts arose between the departments/vendor but the availability of all decision makers made it easy to sort out all the issues. Best team engagement is the second CSF of the project and management decided to engage the best people available in the company for the project. As I mentioned in the planning section, the operations and financial Heads (CFO) were members of the implementation team and they both were accountable for their respective department activities. Therefore, they put their best people on this project. Implementation went very smooth and all required features were implemented without any problem. IT enablement is the third key CSF of this implementation. Top Management decided since planning the stage to use the IT as it is the key enabler to the business and no business would be acceptable in the company without ERP/front end application. Here I need to highlight that the company has been underwriting more than 1,000 polices per month but at the end of month nobody would have to sit late for month end activity. As compared with the traditional organizations, a large team would sit late for month end activity for at least 10 days of the following month. User training is the fourth key CSF of the ERP implementation. ERP team created a proper process document for all users on how to use E-learning and in addition, they setup training administration team to add processes in the E-learning module. As Author mentioned in the planning section, this e-learning module was linked with KPI of the employee, therefore, the acceptability of this E-learning tool was incredible. Finally, the CEO certification created good impact in the company. Project management review committee was the fifth CSF of the project. In the middle of the implementation, the project top management created Project Management committee and the responsibility of the committee was to review the project, resolve the conflicts between departments, vendor and the team, etc. As the Company C was the new company therefore all employees managing the Quality of the master data themselves but it was one the CSF of this implementation. In the end the author compared their studies with Somers & Nelson [4] CSF's which is highlighted in the table-4.

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Critical Success factors	Pre-Implementation	During-Implementation	Post-Implementation
Top Management commitment	High	High	High
Project Team Competence	High	High	High
Interdepartmental Co-operation	High	High	Medium
Clear Goals and Objective	High	Medium	Medium
Project Management	High	Medium	Medium
Inter Department Communication	Medium	Medium	Medium
Management of Expectation	High	High	Medium
Project Champion	Medium	High	Medium
Vendor Support	High	Medium	Medium
Careful Package Selection	High	Medium	Medium
Data Analysis and Conversion	Low	Low	Low
Dedicated Resources	High	High	Medium
Steering Committee	Low	Medium	Low
User Training	High	High	High
Education on New BP	High	High	High
BPR	Low	Low	Low
Minimal Customization	High	High	Medium
Architecture Choices	High	High	Medium
Change Management	High	Medium	Medium
Vendor Participation	High	High	High
Vendor Tools	Low	Medium	Low
Use of Consultant	Low	Medium	Low

Table- 4: Critical Success Factor list is taken from Somers & Nelson[4]

CONCULSION

ERP software is designed to provide end to end solution to the organizations and its objective is to support and integrate business. Previously, implementing the ERP was assumed to be very complex, very expensive, requirement of lots of additional human resources and time consuming job but now due to the availability of a number of case studies, good experienced consultants and mature software this risk has been reduced significantly. The objective of this study is to identify the CSFs of ERP implementation. Author categories the CSF's into 3 project stages (Pre-Implementation, During Implementation and Post implementation). When author compared the work of all case studies, they identified that the top management commitment & dedicated team engagement was critical in the Pre-Implementation. Training of the users, Master data quality, Data migration has been identified as the other CSF for large organization & old organization in the during implementation stage. In the post implementation phase the top management commitment was again a very important CSF.

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APPENDIX A

Questionnaire to get information about Company with Respect to the CSFs Ranking the ERP project Implementation

Critical Success Factor	***EI***	***I***	***SI***	***NI***
Top Management Support				
Project Team Competence				
Interdepartmental Co-operation				
Clear Goals and Objectives				
Project Management				
Inter-departmental Communication				
Management of Expectations				
Project Champion				
Vendor Support				
Careful Package Selection				
Data Analysis and Conversion				
Dedicated Resources				
Steering Committee				
User Training				
Education on New Business Processes				
BPR				
Minimal Customization				
Architecture Choices				
Change Management				
Vendor Partnership				
Vendor Tools				
Use of Consultants				

(EI= Extremely Important , I= Important, SI= Somewhat Important and NI= Not Important)

CSFs taken from: Somers, T.M., & Nelson, K. (2001) The Impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations. *Proceedings of the 34th Hawaii International Conference on System Sciences* (HICSS-3) January 3-6, 2001.